

## **REMARKS**

### **Restriction Requirement**

Applicants' regretfully acknowledge the Examiner's decision to maintain the Restriction Requirement and further to make the Restriction Final. Applicants will file a Petition to request withdrawal of the Restriction Requirement.

### **Amendments**

Claim 1 is amended to correct the typographical error noted by the Examiner concerning the commas in " $N(C_nF_{(2n+1-x)},H_x)_2$ " and " $(C_nF_{(2n+1-x)},H_x)$ ." Similar amendments are made to claims 3 and 14. Claim 1 is also amended to replace "An ionic liquid" with "A compound," pursuant to the Examiner's request. Finally, claims 21-28 are amended to correct an obvious typographical error concerning the + charge of the groups defined by the subformulae.

### **Rejection under 35 U.S.C. §112, first paragraph**

The formula in claim 25 is amended to indicate that the structure shown for  $K^+$  is charged. Similar amendments are made to claims 21-24 and 26-28. See, e.g., page 2 of the specification and original claim 1. Withdrawal of the rejection is respectfully requested.

### **Rejection under 35 U.S.C. §112, second paragraph**

As noted above, claim 1 is amended to replace "An ionic liquid" with "A compound." Also, claims 1, 3 and 14 are amended to delete the commas from  $N(C_nF_{(2n+1-x)}H_x)_2$  and  $(C_nF_{(2n+1-x)}H_x)$ . Withdrawal of the rejection is respectfully requested.

### **Rejection under 35 U.S.C. §103 in view of Koch et al. in combination with Heider et al. '454, Heider et al. '212, and Hilarius et al.**

Claims 1-11, 14-18 and 25 are rejected as allegedly being obvious in view of Koch et al. (US '602) in combination with Heider et al. (US'454), Heider et al. (US'212), and Hilarius et al. (US '883). This rejection is again respectfully traversed.

At columns 2-3, Koch et al. disclose nine formulas for ionic liquids. Each of these formulas includes an anion  $X^-$  which is generally defined as is a non-Lewis acid

containing a polyatomic anion having a van der Waals volume exceeding  $100 \text{ \AA}^3$ . In the rejection, the Examiner refers specifically to the disclosure of Koch et al. at column 2, lines 40-45, column 3, lines 52-53, Table 3, and Example V.

At column 2, lines 40-45, Koch et al. disclose an imidazolium genus of ionic liquids. At column 3, lines 51-55, Koch et al. discloses one group anions. Specifically, this portion of the disclosure states:

In other embodiments, the anion is a mono- or diperfluorosulfonate, or the anion is any one of  $(\text{CF}_3)_2\text{PF}_4^-$ ,  $(\text{CF}_3)_3\text{PF}_3^-$ ,  $(\text{CF}_3)_4\text{PF}_2^-$ ,  $(\text{CF}_3)_5\text{PF}^-$ ,  $(\text{CF}_3)_6\text{P}^-$ ,  $\text{SF}_5\text{CF}_2\text{SO}_3^-$ ,  $\text{SF}_5\text{CHFCF}_2\text{SO}_3^-$ ,  $\text{CF}_3\text{CF}_2(\text{CF}_3)_2\text{CO}^-$ ,  $(\text{CF}_3\text{SO}_2)_2\text{CH}^-$ ,  $\text{SF}_5\text{C}^-$ , or  $(\text{O}(\text{CF}_3)_2\text{C}_2(\text{CF}_3)_2\text{O})\text{PO}^-$ .

However, this is not the only group of anions disclosed by Koch et al. See, e.g., the "exemplary" anions disclosed at column 3, lines 9-50. Also, Table 3 lists 18 anions and their respective van der Waals volumes.

Examples I, III, IV and Example V disclose imidazolium compounds. Example I discloses the synthesis of 1,2-dimethyl-3-propylimidazolium Imide and 1,2-dimethyl-3-propylimidazolium Methide (Imide =  $(\text{CF}_3\text{SO}_2)_2\text{N}^-$ , and Methide =  $(\text{CF}_3\text{SO}_2)_3\text{C}^-$ ). Example III discloses the synthesis of 1-ethyl-3-methylimidazolium perfluoro-1,1-dimethylpropyl alkoxide (see also Compound I in the text bridging columns 3 and 4). Example IV discloses the synthesis of perfluoro-1-ethyl-3-methylimidazolium Imide (see also Compound II in the text bridging columns 3 and 4). Example V discloses four ionic compounds, each having 1,2-dimethyl-3-propylimidazolium (DMPI) as the cation. The four different anions are identified as  $\text{PF}_6^-$ ,  $\text{AsF}_6^-$ ,  $\text{Im}^-$ , and  $\text{Me}^-$  (Im and Me are Imide and Methide, respectively, as defined in US '602). It is noted that, aside from  $\text{PF}_6^-$ , none of these anions are P anions. Moreover, none of these anions, including  $\text{PF}_6^-$ , suggest an anion in accordance with group A of applicants' formula I.

In the rejection, the Examiner alleges that Koch et al. teach an ionic liquid wherein the cation is imidazolium and the anion is selected from  $(\text{CF}_3)_2\text{PF}_4^-$ ,  $(\text{CF}_3)_3\text{PF}_3^-$ ,  $(\text{CF}_3)_4\text{PF}_2^-$ ,  $(\text{CF}_3)_5\text{PF}^-$ , and  $(\text{CF}_3)_6\text{P}^-$ . However, no such specific teaching is presented in Koch et al. The Examiner acknowledges that Koch et al. does not contain such a specific teaching at the bottom of page 9 of the Office Action, wherein it is asserted that the difference between the invention and the Koch et al. disclosure is that the "claimed invention is generically

described in Koch et al." Thus, the Examiner argues that Koch et al. presents a generic description which encompasses these any many other ionic liquids.

The only rationale presented in the rejection for motivation to select a compound of applicants' claimed invention from this generic disclosure is the allegation that the "indiscriminate selection of 'some' among 'many' is *prima facie* obvious," citing *In re Lemin*. However, this clearly does not reflect the current state of the law with respect to structural obviousness.

It is by now well settled law that the mere disclosure of a broad chemical genus, in and of itself, does not render obvious every species encompassed therein. Instead, there must be some motivation that would lead one to select the particular species. In the instant case, no such motivation is presented.

See, e.g., *In re Jones*, 21 USPQ2d 1941, 1943, (Fed. Cir. 1992) wherein the Court in reversing the Board's decision of *prima facie* obviousness, disputed the Board's reliance on the Court's prior decision, *Merck & Co. v. Biocraft Labs, Inc.*, 10 USPQ2d (Fed. Cir. 1989):

We **decline** to extract from *Merck* the rule that the Solicitor appears to suggest -- that regardless of how broad, a disclosure of a chemical genus renders obvious any species that happens to fall within it. .... In contrast, though Richter [the prior art relied on] discloses the potentially infinite genus of 'substituted ammonium salts' of dicamba, and lists several such salts, the claimed salt here is not specifically disclosed. Nor, as we have explained above, is the claimed salt sufficiently similar in structure to those specifically disclosed in Richter as to render it *prima facie* obvious (emphasis added).

Thus, the analysis used by the Court in *Jones* to determine whether obviousness was established by the prior art was to compare the claimed salt with those salts specifically disclosed by the prior art reference. However, in the instant case, when one compares the specific imidazolium compounds disclosed by Koch et al. in Examples I, III, IV, and V, it is evident that these compounds do not suggest the compounds of applicants' claimed invention. See the discussion below.

See also the Court's decision in *In re Baird*, 29 USPQ2d 1550 (Fed. Cir. 1994). In that case, the Court noted that the prior art genus of diphenol compounds for use in developer compositions encompassed bisphenol A, which was used as part of a claimed toner composition. However, the Court held that this generic disclosure did not render

obvious the particular claimed embodiment, after comparing the structure of bisphenol A with the structures of the specifically disclosed diphenols in the prior art reference.

Compare also the more recent non-precedential opinion issued by the Board in *Ex parte Rozzi*, 63 USPQ2d 1196, (Bd. of Pat. Appls. & Interf. 2002), where the Board, in reversing an obviousness rejection stated:

**The Examiner does not make out a case of obviousness merely by virtue of the fact that the subject matter of a rejected claim is, to use the examiner's words, 'generically' described by the prior art. (emphasis added)**

When one looks to the specific embodiments disclosed in US '602 and applies the analysis used in *In re Jones*, it is evident that US '602 does not suggest a compound of applicants' claimed invention. The specific ionic fluids disclosed in US '602 are 1-ethyl-3-methylimidazolium perfluoro-1,1-dimethylpropyl alkoxide in which the anion is  $\text{CF}_3\text{CF}_2(\text{CF}_3)_2\text{CO}^-$ , perfluoro-1-ethyl-3-methylimidazolium imide in which the anion is bis(trifluoromethylsulfonyl) imide ("Imide"), 1,2-dimethyl-3-propylimidazolium Imide, 1,2-dimethyl-3-propylimidazolium tris(trifluoromethylsulfonyl) methide ("Methide"), n-butylpyridinium Imide, n-butylpyridinium Methide, 1-ethyl-3-methylimidazolium perfluoro-1,1-dimethylpropyl alkoxide, perfluoro-1-ethyl-3-methylimidazolium Imide, 1,2-dimethyl-3-propylimidazolium  $\text{PF}_6^-$ , and 1,2-dimethyl-3-propylimidazolium  $\text{AsF}_6^-$ .

Thus, in terms of specific species, US '602 disclose ionic fluids in which the cations are substituted by alkyls or perfluoralkyls and the anions are  $\text{CF}_3\text{CF}_2(\text{CF}_3)_2\text{CO}^-$ , bis(trifluoromethylsulfonyl)  $[-\text{N}(\text{SO}_2\text{CF}_3)_2]$ , tris(trifluoromethylsulfonyl)  $[-\text{C}(\text{SO}_2\text{CF}_3)_3]$ ,  $\text{PF}_6^-$  or  $\text{AsF}_6^-$ .

In *Jones*, the Court looked to the specific salts described in the prior art to see if they suggested the claimed salt, i.e., the 2-(2'-aminoethoxy)ethanol salt of dicamba, a primary acyclic amine salt with an ether linkage,. While the prior art broadly generically disclosed amine salts of dicamba, the Court compared the structure of the claimed amine salt with the specific amine salts disclosed by the prior art. The prior art diethanolamino salt was said to be a secondary amine without an ether linkage. The prior art morpholino salt, while having an ether linkage, was noted to be cyclic. Finally, the prior art isopropylamino salt was said to be a primary amine but with a structure that was "quite

different.” Based on this analysis, the Court held that the prior art did not suggest the claimed salt.

In the instant case, the anions of the specific ionic fluids disclosed by US ‘602 are  $\text{CF}_3\text{CF}_2(\text{CF}_3)_2\text{CO}^-$ ,  $-\text{N}(\text{SO}_2\text{CF}_3)_2$ ,  $-\text{C}(\text{SO}_2\text{CF}_3)_3$ ,  $\text{PF}_6^-$  and  $\text{AsF}_6^-$ . Such structures in no way suggest a fluorinated phosphate structure in accordance with applicants’ claims. The rejection presents no rationale as to how one of ordinary skill in the art, using the analysis by the *Jones* Court, would arrive at an embodiment in accordance with applicants’ claimed invention.

In the Office Action, the Examiner also argues that while “the teaching in Koch et al. may be considered broad to some, Koch et al. teach and suggest the instant claimed invention.” The supporting disclosures asserted for the Examiner’s conclusion are the compounds of Examples I-III, the anions in column 3, lines 52-52, and the anions in Table 3. It is noted that the compounds of Examples I-III do not have P anions nor do they suggest a structure in accordance with group A in applicants’ formula I.

With respect to the anions in column 3, lines 52-52, and the anions in Table 3, it is noted that these are anions, not compounds, i.e., not ionic liquids. In addition, the anions at column 3, lines 52-53 are part of a much broader disclosure of anions at column 3, lines 9-55 and Koch et al. provide no suggestion of selecting the anions at lines 52-53 over any of the other anions encompassed within this generic description.

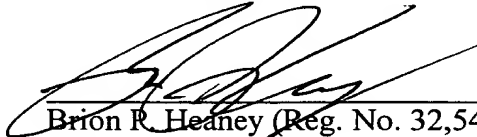
Finally, the anions listed in Table 3 include both anions within the genus of Koch et al. as well as anions outside the scope thereof (e.g., the first 5 anions have a van der Waals volume of less than  $100 \text{ \AA}^3$ ). Furthermore, of the anions listed in Table 3 that have a van der Waals volume exceeding  $100 \text{ \AA}^3$ ,  $(\text{CF}_3)_2\text{PF}_4^-$  just barely has a van der Waals volume exceeding  $100 \text{ \AA}^3$ , i.e.,  $105 \text{ \AA}^3$ . The other anions of the genus of US ‘602 that are listed in Table 3 all have van der Waals volumes exceeding that of  $(\text{CF}_3)_2\text{PF}_4^-$ . Thus, the listing of the anions in Table 3 actually suggests away from the use of  $(\text{CF}_3)_2\text{PF}_4^-$  due to its comparatively low van der Waals volume. It is noted that US ‘602 does not disclose any ionic fluid containing the anion  $(\text{CF}_3)_2\text{PF}_4^-$ .

In addition, US ‘602 does not lead one of ordinary skill in the art to the **cations** described in applicants’ claims 4 and 5. In the ionic liquids specifically disclosed in US ‘602, the cations are 1-ethyl-3-methylimidazolium, perfluoro-1-ethyl-3-methylimidazolium,

isocyanates in electrolyte compositions for use in batteries. However, these secondary references fail to provide any motivation to select a compound of applicants' claimed invention from the generic disclosure of Koch et al.

In view of the above remarks, it is respectfully submitted that Koch et al. fails to render obvious Applicants' claimed invention. Withdrawal of the rejection under 35 U.S.C. §103 is respectfully requested.

Respectfully submitted,



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